UNIVERSITY OF MINNESOTA

CENTER FOR URBAN AND REGIONAL AFFAIRS

PROGRAM IN URBAN TRANSPORTATION

With the aid of a grant from the U.S. Department of Housing and Urban Development and the U.S. Department of Transportation, the University has established an interdisciplinary program of graduate study in Urban Transportation, administered by the Center for Urban and Regional Affairs. During the academic year 1969-70, several fellowships will be available, as well as several research assistantships. It is the purpose of this memorandum to summarize the important aspects of the program. For more information on specific aspects, interested persons are referred to the appropriate bulletins: e.g. Graduate School, College of Liberal Arts, Institute of Technology, etc.

Fellowships and Assistantships

Fellowships will be available to candidates in each of the following categories:

A. Recent recipients of the Bachelor's degree

B. Holders of the Master's degree

C. Persons engaged in professional practice of a field related to urban transportation who wish to return to the University for graduate study to broaden their viewpoints and to learn new techniques that will assist them in their profession

Stipends which are believed to be unusually attractive will be based on the previous education and experience of the recipients. These fellowships are for full-time study.

Several research assistantships are available. These assistantships call for the recipient to devote approximately one-half of his time to assisting in some research project.

Curricula for Graduate Study

The University offers both the Master's and Ph.D. in many fields. The Master's degree is normally the M.A. in non-technical departments, and the M.S. degree in technical departments. There are currently two options for a Master's degree program:

Plan A - A minimum of 18 quarter credits in the major field and 9 credits in a minor field plus a Master's thesis.

Plan B - A minimum of 45 quarter credits, of which at least 21 credits are in the major field and at least 18 credits are from at least two related fields with a minimum of 6 credits required in each. Also requires 3 papers (of the quality but not range of an M.S. thesis) in 3 of the courses.

Graduate students in several of the engineering departments have the option of pursuing studies leading to the Master of Engineering degree, which calls for a design project rather than a thesis.

Curricula for advanced study in urban transportation will normally be "tailored" for each student in relation to his previous training and career objectives. This is especially true in the case of the Ph.D.

Programs of Study in Urban Transportation

Each graduate student participating in the Urban Transportation Program, on being admitted to Graduate School will select a discipline relevant to urban transportation, such selection to be made from the list of disciplines having established graduate programs. After admission, he will be assigned two advisors by the Administrative Committee of the Interdisciplinary Program in Urban Transportation. One advisor will represent a technical field and one will represent a socio-humanistic field. Each student will, with the help of his advisors, plan a program of study majoring in the discipline of his choice but with a strong interdisciplinary relevance to urban transportation.

Students enrolled in the Program in Urban Transportation will be expected to participate in a core seminar in Urban Transportation. Other course work relevant to the students' interests will be drawn from regular University courses as discussed herein. Students without previous professional experience in a field related to urban transportation will be expected to engage in an internship at some appropriate agency.* (This internship will usually take place during the summer following the first year of study.) As an adjunct to the internship, students who have not had an opportunity to attend a national meeting of a professional society will be urged to attend such a meeting, and will be reimbursed for the travel involved.

Students studying for the Master's degree will be strongly urged to follow Plan A (the plan which includes a thesis--see discussion under Curricula for Graduate Study). Where feasible, arrangements will be made for thesis research to be conducted in an interdisciplinary manner. The degree received by each student will be that normally conferred in the discipline of his selection. In addition to the normal degree diploma, each student completing a degree under the Program in Urban Transportation will receive an appropriate certificate.

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* Where the site of the internship involves travel, the students will be reimbursed in accordance with normal University travel procedures.

Sample Programs

As an example of a typical program, the Department of Civil Engineering has initiated an M.S. program with a specialization in Urban Transportation. Sample programs for the Master's degree are detailed on the following page. They illustrate the flexibility and wide choice of disciplines open to Civil Engineering students under this option. Similar programs, combining a wide range of options around a disciplinary core, are also available in other technological and social sciences.

Applications

Persons desiring to enroll under the Program in Urban Transportation should write for appropriate forms to:

Center for Urban and Regional Affairs
311 Walter Library
University of Minnesota
Minneapolis, Minnesota 55455

Attn: Coordinator of Program in Urban Transportation

TABLE III - 1

TYPICAL PROGRAM FOR M.S. IN CIVIL ENGINEERING: PLAN A (Thesis)

Fall Term			Winter Term			Spring Term		
	Seminar in Urban Transportation	(3)	CE 130	Introduction to Transportation Planning	(3)	CE 215	Advanced Transportation Planning	(3)
CE 210	Theory of Traffic Flow	(3)	CE 211	Urban Traffic Operations	(3)	CE 212	Freeway Traffic Operations	(3)
QA 151	Elements of Statistics	(3)	IE 198	Design and Analysis of Experiments I	(3)	IE 199	Design and Analysis of Experiments II	(3)
		9			9			9

TYPICAL PROGRAM FOR M.S. IN CIVIL ENGINEERING: PLAN B (No thesis)

Fall Term			Winter Term			Spring Term		
	Seminar in Urban Transportation	(3)		Seminar in Urban Transportation	(3)		Seminar in Urban Transportation	(3)
CE 210	Theory of Traffic Flow	(3)	CE 130	Introduction to Transportation Planning	(3)	CE 215	Advanced Transportation Planning	(3)
CE 158	Airport Design	(3)	CE 211	Urban Traffic Operations	(3)	CE 212	Freeway Traffic Operations	(3)
QA 151	Elements of Statistics	(3)	IE 198	Design and Analysis of Experiments I	(3)	CE 152	Geometric Highway Design	
							or	(3)
						CE 112	Aerial Surveys and Photogrammetry	
IE 130	Introduction to Operations Research	(3)	Geog 167	Location and Geographic Design I	(3)	Geog 168	Location and Geographic Design II	(3)
		15			15			15

Note: As courses in mass transit are developed, they may be substituted as appropriate.

Current Courses Relevant to Urban Transportation

Architecture

Arch	131	Planning: Theory and Methodology
Arch	132	Planning: Urban Function and Structure
Arch	133	Planning: Housing and Community Facilities

Business Administration

QA	158	Quantitative Approaches to Administrative Problems
QA	171	Statistical Methods for Sample Surveys
QA	181	Quality Control and Industrial Statistics
QA	191A-B	Statistical Methods in Business Administration
MIS	209A	Introduction to Hardware and Software Systems
Mgmt	150	Fundamentals of Management
Trans	154	Fundamentals of Transportation
Trans	184	Carrier Management

Civil Engineering

CE	130	Introduction to Transportation Planning
CE	151	Advanced Highway Laboratory
CE	152	Highway Design
CE	153	Soils in Highway Engineering
CE	154	Design of Highway and Airport Pavements
CE	156	Highway Traffic Engineering
CE	158	Airport Design
CE	168	Public Works Engineering
CE	210	Seminar in Theory of Traffic Flow
CE	211	Seminar in Urban Traffic Operations
CE	212	Seminar in Freeway Traffic Operations
CE	215	Seminar in Advanced Transportation Planning
CE	280, 281, 282	Civil Engineering Research

Economics

Econ	101	Introduction to Decision Theory
Econ	140	Economics of Location and Transportation
Econ	185A-B-C	Microeconomic Theory
Econ	195A-B-C	Decision Making and Operations Analysis

Electrical Engineering

EE	107-8	Linear System Analysis
EE	129A-B	Control Systems

Geography

Geog	165	Urban Geography
Geog	167-8	American Cities - Location and Geographic Design
Geog	181-2	Statistical and Advanced Cartography
Geog	184	Air Photo Interpretation
Geog	187	Quantitative Research Design
Geog	188	Area Sampling and Analysis
Geog	200 & 301	Directed Reading and Research Problems (Student Choice)
Geog	221-2-3	Seminar: Quantitative Geography
Geog	256-7-8	Land Use Planning
Geog	271-2-3	Historical Economic Geography

Industrial Engineering

IE	100	Introduction to Industrial Engineering Analysis
IE	120	Probability Models
IE	130	Introduction to Operations Research
IE	172	Manufacturing Cost Analysis
IE	133A-134A	Mathematical Models in Operations Analysis
IE	167	Materials Handling
IE	170	Production Planning and Control
IE	171	Quality Control
IE	173	Engineering Economic Analysis
IE	180	Management for Engineers
IE	182	Industrial Safety
IE	193	Introduction to Optimal Control and Dynamic Programming
IE	195-6	Applied Industrial Engineering
IE	198	Design and Analysis of Experiments I
IE	199	Design and Analysis of Experiments II

Law

Law	137	Land Use Planning
Law	140	Administrative Law
Law	148	Seminar: Public Affairs (Legal problems in Minnesota public affairs)
Law	159	Local Government Law
Law	164A	Regulated Industries
Law	193	Seminar: Urban Affairs

Mathematics

Math	133A-134A	Probability with Technological Applications
Math	164-5-6	Theory and Programming of Modern Digital Computers
Math	173-4-5	Elementary Partial Differential Equations
Math	178	Probability
Math	178A-B-C	Introduction to Probability
Math	184	Elementary Numerical Analysis in Engineering
Math	185-6	Numerical Analysis in Engineering
Math	280A-B-C	Mathematics of Computers and Control Devices
Math	285A-B-C	System Programming
Math	293	Information Theory

Mechanical Engineering

ME	123	Creative Engineering
ME	127	Friction and Lubrication
ME	129	Vibration Engineering
ME	146A	An Introduction to Combustion and Propulsion
ME	170	Manufacturing Processes
ME	191-192-193	Mechanical Engineering Design
ME	197	System Analysis and Control
ME	198	Industrial Instrumentation and Control
ME	199	Advanced System Analysis and Control
ME	223	Advanced Vibration Engineering
ME	224-5-6	Advanced Applied Dynamics
ME	296-7-8	Feedback Control Systems

Mineral Engineering

MinE	240	Advanced Concepts in Drilling of Rocks

Political Science

Pol	115	State Government
Pol	116	Introduction to Community Politics

Political Science (Cont.)

Pol	118	Metropolitan Government and Politics
Pol	130-131	Administrative Processes

Public Administration

PA	210	Public Administration and the Political Process
PA	212	Issues in American Public Policy - Transportation
PA	270A	Administrative Theory and Behavior - Transportation
PA	270B-C	Administrative Management - Transportation
PA	280A	Local Administration
PA	281	Law and Urban Affairs
PA	282A-B-C	Administrative Internship (with a Transportation agency)
PA	283	Research (in urban transportation administration)
PA	247	Urban Development
PA	265	Intergovernmental Administrative Relations
PA	284	Individual Reading and Research

Public Health

PubH	153	Principles and Methods of Accident Prevention
PubH	154	Special Studies in Accident Prevention
PubH	155	Introduction to the Air Pollution Problem

Statistics

Stat	121-122-123	Theory of Statistics
Stat	131-132-133	Theory of Statistics
Stat	191-192-193	Analysis and Design of Experiments
Stat	194	Introduction to Correlation and Multivariate Analysis

Sociology

Soc	111	Population Theory
Soc	115	Social Aspects of Housing and Standards of Living
Soc	145	Urban Sociology
Soc	245-246	Seminar in Urban Sociology

Proposed New Courses

Core Seminar

All students of urban transportation, regardless of discipline, will be expected to participate in an Interdisciplinary Seminar in Urban Transportation. This seminar will be organized by the Program in Urban Transportation, and will include students, faculty and participants from government and industry. (Students will receive degree credit by enrolling under appropriate general seminar course numbers in their respective departments.) The seminar will give heavy emphasis to problems of interaction and communication in planning, research, and execution of plans and also to the development of familiarity and mutual understanding of the various techniques and systems involved in the solution of urban transportation problems.

It is proposed that the Interdisciplinary Seminar in Urban Transportation continue throughout the academic year, with meetings approximately bi-weekly. Lectures will be presented by faculty members and by guest speakers drawn from agencies and private business concerned with urban transportation, not only in the Twin City area, but also from across the nation. Each graduate student participant will be asked to present a paper at an appropriate time.

Other New Courses

Several new courses will be proposed to fill gaps which some students in urban transportation may find in the existing course structure. Courses currently proposed are:

Civil Engineering	Analysis and Functions of Transportation Systems: Study of characteristics common to all transportation systems as well as characteristics which differ; methods of classifying characteristics and functions of transportation systems.

Geography	Transportation Geography: Areal principles and functions of transportation networks; historical and national variations in modal developments; commodity and passenger flows; case studies of regional and local systems.
Mechanical Engineering	Technology of Advanced Transit Systems: Intensive study in application of modern technology to new transit systems; morphological approach to design of fixed-track systems; methods of analyzing propulsion and suspension systems.
Mechanical Engineering	Technology of Mass Transit Systems for Non Engineers: Same as above course but treatment will be more qualative and less analytical.
Psychology	Principles of Bio-engineering: Introduction and discussion of feedback control theory in man-machine interactions; human engineering methodology and data relative to the capacity of the human operator in a variety of control-display relations.